

REMARKS

I. Claim Status

Prior to this amendment, claims 40-78 were pending with claims 50, 52- 54, and 56-77 withdrawn from examination as directed to non-elected subject matter. Office Action, page 2. Claims 56-77 have been cancelled. Claims 40, 44, and 78 are amended to clarify that the cermet has a metallic portion higher than 50 wt%. Support for this amendment is found throughout the specification including, for example, in the cermets prepared as Examples 1 (54 wt% copper) and 2 (70 wt% copper). Claims 47 and 48 are amended to correct for antecedent basis. Accordingly, no new matter is introduced by these amendments. Following this amendment, claims 40-55 and 78 are pending with claims 50 and 52-54 withdrawn but available for rejoinder.

II. Rejections under 35 U.S.C. § 112

The Office rejects claims 40, 44, 47, 48, and 78 under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Office Action, page 2.

A. The Office contends that “[i]t is not clear if” the weight percent recited for the metal content (“higher than 50 wt%”) refers to the “metallic portion of the cermet or total metal content of cermet as the ceramic portion of the cermet can also contain metals in the form of oxide or dopants.” *Id.* While Applicants respectfully disagree, claims 40, 44, and 78 are amended to clarify that it is the metallic portion of the cermet that is present at higher than 50wt%. Accordingly, Applicants request that this rejection be withdrawn.

B. The Office also rejects claims 47 and 48 because the phrase “the ceramic material” lacks “antecedent basis.” Office Action, page 3. Claims 47 and 48 are amended herein to recite “an electrolyte ceramic material portion,” as recited in claim 40. Accordingly, claims 47 and 48 have proper antecedent basis and Applicants request that this rejection be withdrawn.

C. The Office further contends that the term “substantially” is “indefinite” because it is “not defined by the claim [and] the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.” Office Action, page 3. Applicants respectfully disagree.

The definiteness of a claim must be analyzed, not in a vacuum, but in light of various factors including the content of the application, the teaching of the prior art, and the claim interpretation that would be given by one possessing the ordinary level of skill in the art at the time of the invention. M.P.E.P. § 2713.02. Further, as discussed in M.P.E.P. § 2173.05(b), “[t]he fact that claim language, including terms of degree, may not be precise, does not automatically render the claim indefinite under 35 U.S.C. 112, second paragraph.” (citing *Seattle Box Co., v. Industrial Crating & Packing, Inc.*, 731 F.2d 818, 221 USPQ 568 (Fed. Cir. 1984)). Rather, “[a]cceptability of the claim language depends on whether one of ordinary skill in the art would understand what is claimed, in light of the specification.” *Id.*

Here, the as-filed Specification teaches that “substantially uniformly interdispersed” means that “the portions of the cermet are intimately admixed in the

entire volume of the cermet.” Specification as-filed at page 4, II. 1-3; Examples 1 and 2 (“Scanning electron microscopy of the anode suitable for the invention confirmed the formation of a porous structure with both phases (Cu and SDC) intimately mixed and uniformly distributed inside”). One of ordinary skill in the art would have readily understood that the portions of the cermet must be intimately mixed and uniformly distributed to a substantial degree. Thus, based on the teachings in the Specification and the knowledge of one of ordinary skill in the art, Applicants respectfully submit that one of ordinary skill in the art would understand what is claimed when the claim is read in light of the specification, as required. *See* M.P.E.P. § 2173.02. Accordingly, Applicants request withdrawal of the rejection.

III. Rejection under 35 U.S.C. § 102/103

A. Rejections over Lockhart

The Office rejects claims 40, 43, 45, 51, 55, and 78 under 35 U.S.C. § 102(b) as allegedly anticipated by U.S. 5,261,944 to Lockhart et al. (“Lockhart”). Office Action, page 4. The Office also rejects claim 44 under 35 U.S.C. § 103(a) as allegedly obvious over Lockhart. *Id.* at 8. According to the Office, Lockhart “discloses a solid oxide fuel cell . . . with an anode . . . wherein the anode comprises a cermet comprising a metal uniformly interdispersed, wherein the metal content is more than 50% and wherein the specific surface area is 1.9 m²/g.” *Id.* at 4. Applicants respectfully disagree and traverse.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. M.P.E.P. § 2131.

In the instant case, Applicants respectfully submit that the Office failed to show that Lockhart teaches every element of the claims. In particular, independent claim 40 recites, in relevant part, a solid oxide fuel cell comprising a cathode, and an anode, wherein said anode comprises a cermet comprising a metallic portion wherein “**said metallic portion having a melting point equal to or lower than 1200°C.**” (emphasis added). Yet, Lockhart **only** discloses the use of nickel/nickel oxide as its metal phase. However, nickel has a melting point of approximately 1453°C and nickel oxide has a melting point of approximately 1955°C. Thus, any combination of nickel and nickel oxide is outside the scope of the claims that require a “metallic portion having a melting point equal to or lower than 1200°C.” For at least this reason, Lockhart does not teach or suggest each and every element of the claims and, thus, does not anticipate the instant claims. Accordingly, Applicants respectfully request withdrawal of the rejection.

Lockhart also fails to render claim 44 obvious under 35 U.S.C. § 103(a). Citing *In re Wertheim*, the Office contends that Lockhart “discloses nickel content of 35-70 wt%,” and contends that the claimed range of “60 wt% to 90 wt%” for the metallic portion of the cermet would have been obvious. Office Action, page 8. However, as discussed above, Lockhart teaches metallic portions having a melting temperature outside the claimed scope of equal to or lower than 1200°C. Thus, Lockhart’s disclosure of a nickel content of 35-70 wt%,” fails to render claim 44 obvious for at least the reason that

Lockhart fails to teach **any** metallic portion having a melting point equal to or lower than 1200°C. M.P.E.P. § 2143.03 (“All words in a claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)).

Moreover, Applicants note that in order to establish a *prima facie* case of obviousness, the Office must objectively perform each of the following factual inquiries:

- (A) Ascertain the scope and contents of the prior art;
- (B) Ascertain the differences between the claimed invention and the prior art; and
- (C) Resolve the level of ordinary skill in the pertinent art.

Graham v. John Deere Co., 383 U.S. 1, 17-18 (1966); M.P.E.P. § 2141. The obviousness or non-obviousness of the claimed invention is then evaluated in view of the results of these inquiries. *Graham*, 383 U.S. at 17-18; *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 399 (2007). However hindsight cannot replace motivation in the prior art to make the claimed invention. (*KSR*, 550 U.S. at 421 (cautioning against “the distortion caused by hindsight bias” and “arguments reliant upon *ex post* reasoning” in determining obviousness)).

Based on Lockhart, one of ordinary skill in the art would have had no good reason, apart from the present application, to modify Lockhart to include a metallic portion having a melting temperature equal to or lower than 1200°C as required in the instant claims. Lockhart does not even discuss the melting point of its metallic portion. Moreover, Lockhart’s objective is to completely reduce the nickel oxide particles into nickel metal so as to produce a large active nickel surface area for use as a material for an SOFC. Lockhart at col. 1, line 49 to col. 2, line 2. Based on the scope and contents

of Lockhart, one of ordinary skill in the art would not have even known to use a metallic portion with a particular melting temperature, much less to select a metallic portion having a melting temperature equal to or lower than 1200°C. The Office's conclusion of obviousness therefore seek to reconstruct the claimed inventions from the prior art using hindsight bias, which is legally impermissible. *KSR*, 550 U.S. at 421.

Accordingly, Applicants respectfully submit that the Office failed to established a *prima facie* case of obviousness. For at least the reasons present above, Applicants respectfully request withdrawal of the rejection.

B. Rejection over Joerger

The Office rejects claims 40-49, 51, 55, and 78 under 35 U.S.C. § 102(a) as allegedly anticipated by European Solid Oxide Fuel Cell Forum, 2002 to Joerger et al. (“Joerger”), or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Joerger. Office Action, pages 5-6. The Office contends that Joerger “discloses a solid oxide fuel cell with an anode . . . wherein the anode comprises a cermet comprising a metal . . . uniformly interdispersed . . . wherein the metal content is more than 50% (experimental and Results).” *Id.* at 6. The Office acknowledges that Joerger fails to “disclose the specific surface area of the cermet,” but argues that “a cermet with the same composition, microstructure and particle size will inherently have the same surface area.” *Id.* In the alternative, the Office alleges that “it would have been obvious for the person of ordinary skill[] in the art to adjust the surface area to obtain optimum

conductivity (Results and Discussion).” *Id.* Applicants respectfully disagree and traverse.

As discussed above, a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. M.P.E.P. § 2131. Moreover, the scope and contents of the prior art must be first evaluated in order to establish a *prima facie* case of obviousness. *Graham*, 383 U.S. at 17-18.

Here, Applicants respectfully submit that the Office has inadvertently mischaracterized the scope and content of Joerger. More specifically, Joerger teaches that its anode compositions containing a metal portion higher than 50 wt% (i.e., 60 wt% and 73 wt% tested) resulted in a ***heterogeneous dispersion of large metal agglomerates***, i.e., the portions of metal and ceramic were not “substantially uniformly interdispersed,” as required in the instant claims. Joerger at 477. This was expressly distinguished from the anode compositions with a metal portion that was lower (28 wt% and 42 wt%), which were described as homogeneous. *See id.* Thus, in contrast to the Office’s contention that Joerger “discloses a solid oxide fuel cell with an anode . . . wherein the anode comprises a cermet comprising a metal . . . uniformly interdispersed . . . wherein the metal content is more than 50%,” Joerger in fact teaches that when an anode composition contains a metal portion higher than 50 wt%, the metal and ceramic are not “substantially uniformly interdispersed.” Only when the metal portion is lower, i.e., 42 wt% or lower, did Joerger achieve a substantially uniform interdispersion. For at

least this reason, the Office's determinations of anticipation and obviousness are based on an erroneous premise.

Because Joergen fails to teach an anode composition containing portions of metal and ceramic that are "substantially uniformly interdispersed" with a metal portion higher than 50 wt%, Joergen fails to teach all the elements of the pending claims. Accordingly, Joergen does not anticipate claims 40-49, 51, 55, and 78.

Moreover, M.P.E.P. § 2143.03(VI) states that "[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." Here, Joergen teaches away from the claimed "metal portion higher than 50 wt%." Not only did Joergen discover that its method was enabling only for metal portions of 42 wt% and lower, Joergen highlights the negative consequences of having Applicants' claimed higher levels, noting a poor adherence between the anode and the electrolyte and a showing of "a rapid degradation of the conductivity." Joergen at p. 477-79. Hence, Joergen teaches a person of ordinary skill in the art that any attempt to operate at the claimed 50 wt% or above range has a reasonable expectation of **failure**. Accordingly, because Joergen teaches away from having a "metal portion higher than 50 wt%," the claims are not obvious over Joergen.

Accordingly, for at least these reasons, Applicants respectfully submit that the Office failed to establish a *prima facie* case of obviousness.

IV. Conclusion

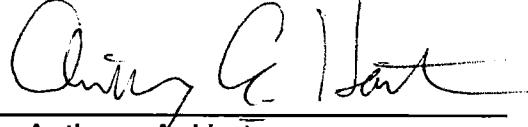
In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account No. 06-0916.

Respectfully submitted,

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